

U.S.S.N. 10/817,084

-3-

HN 1010 PUS

**IN THE CLAIMS:**

1. (cancelled)

2. (currently amended) A process for hot or cold rolling metal strip (18) with a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound, a rolling stand (12) comprising at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable, a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original strip thickness, a first strip storage assembly (23) comprising a plurality of rolls between the first reeling device (21) and the rolling stand (12), and a second strip storage assembly (33) comprising a plurality of rolls between the rolling stand (12) and the second reeling device (31), wherein the rolls of the first and second strip storage assemblies for strip storage purposes are varied in their position relative to one another, the process comprising the steps of:

guiding the metal strip (18) over at least one of the strip storage assemblies (23, 33) in the form of an "S," and in the course of the rolling process, controlling the movement of at least one of the rolls (24, 25, 34, 35) of the strip storage assembly (23, 33) to distort the "S" such that the length of the metal strip between running into and, respectively, running out of the strip storage assembly (23, 33) is varied ~~A process according to claim 1, wherein the step of guiding includes guiding the metal strip (18) over the strip storage assembly (23, 33) in the form of an upright "S" with arches lying at different heights, and which at least partially overlap in a vertical projection.~~

3. (original) A process according to claim 2, wherein, during the controlled movement of at least one of the rolls, the centers of the overlapping arches of the "S" overlap one another at least temporarily in the vertical direction.

4. (original) A process according to claim 2, wherein during the controlled movement of at least one of the rolls, the position of the upper arch of the "S" is changed.

U.S.S.N. 10/817,084

-4-

HN 1010 PUS

5. (original) A process according to claim 2, wherein during the controlled movement of at least one of the rolls, the position of the lower arch of the "S" is changed.

6. (withdrawn) A process for hot or cold rolling metal strip (18), with a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound, a rolling stand (12) comprising at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable, a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original strip thickness, a first strip storage assembly (23) comprising a plurality of rolls between the first reeling device (21) and the rolling stand (12), and a second strip storage assembly (33) comprising a plurality of rolls between the rolling stand (12) and the second reeling device (31), wherein the rolls of the first and second strip storage assemblies for strip storage purposes are varied in their position relative to one another, the process comprising the steps of:

increasing the strip tension at the roll gap (17), by braking at least one roll (24, 25) of the first strip storage assembly (23) with a controllable braking moment; and

increasing the strip tension at the roll gap (17), by driving at least one roll (34, 35) of the second strip storage assembly (33) by a controllable driving moment.

7. (withdrawn) A process according to claim 6, wherein, when rolling strip (18) with a variable strip thickness, the braking moment of the roll of the first strip storage assembly (23) and the driving moment of the roll of the second strip storage assembly (33) are regulated so as to achieve a constant strip tension.

8. (withdrawn) A process according to claim 6, wherein the steps of increasing include changing the braking moment at several rolls of the first strip storage assembly (23) or by changing the driving moment at several rolls of the second strip storage assembly (33).

U.S.S.N. 10/817,084

-5-

HN 1010 PUS

9. (withdrawn) A process according to claim 6 comprising regulating the strip tension by changing the relative roll positions of the rolls of the first strip storage assembly (23) or the roll positions of the rolls of the second strip storage assembly (33).

10. (cancelled)

11. (currently amended) A rolling system for hot or cold rolling metal strip (18) comprising:

a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound;

a rolling stand (12) having at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable;

a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original thickness;

a first strip storage assembly (23) comprising a plurality of rolls located between the first reeling device (21) and the rolling stand (12); and

a second strip storage assembly (33) comprising a plurality of rolls located between the rolling stand (12) and the second reeling device (31).

wherein at least one of the strip storage assembly (23, 33) is a double-roll assembly wherein the strip (18) is wrapped in an S-like way around two rolls (24, 25; 34, 35) whose axes are arranged at different levels, wherein a first roll (24, 34) tensions the strip (18) between the double roll assembly (23, 33) and the rolling stand (12) and wherein a second roll (25, 35) tensions the strip (18) between the double roll assembly (23, 33) and the respective reeling device (21, 31) and wherein, as a result of a movement of at least one movable roll (24, 34; 25, 35), the length of the piece of strip between the reeling device (21, 31) and the second roll (25, 35) or between a second roll (25, 35) and the first roll (24, 34) can be varied during the rolling process, and A rolling system according to claim 10, wherein the rolls of the strip storage assemblies (23, 33) at least partially overlap in a vertical projection.

U.S.S.N. 10/817,084

-6-

HN 1010 PUS

12. (original) A rolling system according to claim 11, wherein the axes of the rolls of the strip storage assemblies (23, 33), when moving, are at least temporarily positioned one above the other.

13. (currently amended) A rolling system for hot or cold rolling metal strip (18) comprising:

a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound;

a rolling stand (12) having at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable;

a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original thickness;

a first strip storage assembly (23) comprising a plurality of rolls located between the first reeling device (21) and the rolling stand (12); and

a second strip storage assembly (33) comprising a plurality of rolls located between the rolling stand (12) and the second reeling device (31).

wherein at least one of the strip storage assembly (23, 33) is a double-roll assembly wherein the strip (18) is wrapped in an S-like way around two rolls (24, 25; 34, 35) whose axes are arranged at different levels, wherein a first roll (24, 34) tensions the strip (18) between the double roll assembly (23, 33) and the rolling stand (12) and wherein a second roll (25, 35) tensions the strip (18) between the double roll assembly (23, 33) and the respective reeling device (21, 31) and wherein, as a result of a movement of at least one movable roll (24, 34; 25, 35), the length of the piece of strip between the reeling device (21, 31) and the second roll (25, 35) or between a second roll (25, 35) and the first roll (24, 34) can be varied during the rolling process, and A rolling system according to claim 10, wherein the strip storage assemblies (23, 33) each comprise a movable roll (24, 34) arranged above a further roll (25, 35), and wherein the strip material in the first strip storage assembly (23) runs in via the further roll (25) and runs out via the movable roll (24) and, in the second strip storage assembly (33), runs in via the movable roll (34) and runs out via the further roll (35).

U.S.S.N. 10/817,084

-7-

HN 1010 PUS

14. (currently amended) A rolling system for hot or cold rolling metal strip (18) comprising:

a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound;

a rolling stand (12) having at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable;

a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original thickness;

a first strip storage assembly (23) comprising a plurality of rolls located between the first reeling device (21) and the rolling stand (12); and

a second strip storage assembly (33) comprising a plurality of rolls located between the rolling stand (12) and the second reeling device (31).

wherein at least one of the strip storage assembly (23, 33) is a double-roll assembly wherein the strip (18) is wrapped in an S-like way around two rolls (24, 25; 34, 35) whose axes are arranged at different levels, wherein a first roll (24, 34) tensions the strip (18) between the double roll assembly (23, 33) and the rolling stand (12) and wherein a second roll (25, 35) tensions the strip (18) between the double roll assembly (23, 33) and the respective reeling device (21, 31) and wherein, as a result of a movement of at least one movable roll (24, 34; 25, 35), the length of the piece of strip between the reeling device (21, 31) and the second roll (25, 35) or between a second roll (25, 35) and the first roll (24, 34) can be varied during the rolling process, and A rolling system according to claim 10, wherein the strip storage assemblies (23, 33) each comprise a movable roll (25, 35) arranged underneath a further roll (24, 34), and wherein the strip material in the first strip storage assembly (23) runs in via the movable roll (25) and runs out via the further roll (24) and, in the second strip storage assembly (33), runs in via the further roll (34) and runs out via the movable roll (35).

15. (original) A rolling system according to claim 13, wherein each movable roll (24, 34), in operation, is movable perpendicularly relative to a pass line (28).

U.S.S.N. 10/817,084

-8-

HN 1010 PUS

16. (original) A rolling system according to claim 14, wherein each moveable roll (25, 35), in operation, is movable perpendicularly relative to a pass line (28).

17. (original) A rolling system according to claim 13, wherein each movable roll (24, 34), in operation, is movable parallel to a pass line (28).

18. (original) A rolling system according to claim 14, wherein each movable roll (25, 35), in operation, is movable parallel to a pass line (28).

19. (original) A rolling system according to claim 13, wherein each movable roll (24, 34) is arranged to oscillate around an axis of rotation of the respective further roll (25, 35).

20. (original) A rolling system according to claim 14, wherein each movable roll (25, 35) is arranged to oscillate around an axis of rotation of the respective further roll (24, 34).

21. (cancelled)

22. (currently amended) A rolling system according to claim ~~40~~ 11, wherein the strip (18) runs off from an underside of the first reeling device (21).

23. (currently amended) A rolling system according to claim ~~40~~ 11, wherein the strip (18) runs in on an underside of the second reeling device (31).

24. (withdrawn) A rolling system for hot or cold rolling metal strip (18) comprising:

a first reeling device (21) from which strip (18) with a defined strip original thickness is unwound;

a rolling stand (12) having at least two working rolls (13, 14) between which there is formed a roll gap (17) whose width is controllable;

a second reeling device (31) for reeling-on strip (18) whose strip thickness is reduced relative to the original thickness;

U.S.S.N. 10/817,084

-9-

HN 1010 PUS

a first strip storage assembly (23) comprising a plurality of rolls located between the first reeling device (21) and the rolling stand (12); and

a second strip storage assembly (33) comprising a plurality of rolls located between the rolling stand (12) and the second reeling device (31),

wherein at least one roll of the first strip storage assembly (23) is connected to a variable, controllable braking moment generator (100), and wherein at least one roll of the second strip storage assembly (33) is connected to a variable, controllable driving moment generator (102).

25. (withdrawn) A rolling system according to claim 24, wherein at least one of the braking moment generator or driving moment generator comprise electrical machinery.

26. (withdrawn) A rolling system according to claim 24, wherein at least one of the braking moment generator or driving moment generator comprise hydrostatic machinery.

27. (withdrawn) A rolling system according to claim 24 comprising a further freely rotating roll (19, 29) arranged directly in front of the first strip storage assembly (23, 33) or directly behind the second strip storage assembly (33).

28. (withdrawn) A rolling system according to claim 24 comprising a further brakable roll (19, 29) arranged directly in front of the first strip storage assembly (23) or a further drivable roll (29) arranged directly behind the second strip storage assembly (33).

29. (withdrawn) A rolling system according to claims 24 comprising further rolls (19, 29) for measuring the strip tension which are supported via load cells (20, 30) at fixed webs.